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## RATE OF NATURAL INCREASE OF POPULATION IN UNITED STATES.

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Many criticisms of the accuracy of the enumeration of the Eleventh Census have appeared during the past month, based upon the fact that this enumeration, when compared with those of 1860 and of 1880, would indicate a very marked falling off in our rate of natural increase. Because the decennial rate of natural increase fell from an average of 18.5 per cent for the two decades 1860 to 1880 to 14.4 per cent, the rate for the decade 1880 to 1890, these critics argue that the enumeration of 1890 must be defective.

Aside from any consideration touching the accuracy of the recent enumeration of our population, this question of decline in our rate of natural increase is an important and interesting one, and far reaching in its effect, and it may therefore be worth while to call attention to some facts bearing upon it. In the first place, let us understand the meaning of "natural increase" as used in this connection. This expression is intended to define the increase of our population due to the excess of births over deaths, irrespective of the effects of immigration. The rate of natural increase can therefore be defined as the excess of the birth rate over the death rate.

Let us first examine a few of the causes affecting the death rate. The most important factor bearing upon this rate is the age distribution of our living population due to the great variation in the death rate at different age periods. The question therefore first to be considered is, has there been any great change in the age distribution of the population of the United States during the past half century? To answer this we need but call attention to the following table:—

Year.	Per Cent of Total Population over 40 Years of Age.	
1850	16.94	
1860	17.81	
1870	19.97	
1880	20.93	

In other words, while in 1850 only 17 per cent of our total population was over forty years of age, in 1880 we find twenty-one per cent of the aggregate population above that age. To discuss the effect in detail of this upon our death rate, and consequently upon the rate of natural increase, would be beyond the limits of the present article. It needs but a moment's consideration, however, to see that, other things being equal, the effect of this would be to increase to a very material extent the death rate, for we know that after forty years of age the death rate increases very rapidly. On the other hand, the excess of this aged and sterile class would, of course, reduce the birth rate. The net effect thus being to reduce the rate of natural increase, first by increasing the death rate, and further by decreasing the birth rate.

While the effects of changes in the death rate might be considerable, they would not be likely to effect the rate of increase so much, or so directly, as changes in the birth rate. The death rate is subject to but slight causes of variations outside of the influence of age distribution, and may be considered beyond human control. The birth rate, however, is largely dependent upon conditions entirely within the control of the population itself. The age at marriage and the proportion of married women within certain age limits control almost directly the birth rate, and are entirely within the control of the population. Dr. Farr, for example, has shown that the rate of natural increase in England could be doubled by simply transferring a part of the unmarried women to the ranks of the married. This is cited to show the possible extent of the influence of these factors on the rate of natural increase.

Let us now consider for a moment such fragmentary and unsatisfactory data as we have, throwing light on the birth rate in this country during the past fifty years. And here it is difficult to refrain from calling attention to the fact that, were the different papers and writers, now so freely questioning the accuracy of the last enumeration, because there has been a falling off of the rate of natural increase, to utilize their energy in the direction of establishing in this country some thorough and complete system for the registration of births, deaths, and marriages, and securing some comprehensive tabulation of the yearly immigration by age and sex, they would do a service tenfold more valuable to the country at large. However, had we such data at hand there would be no need to reply to the criticisms upon the Eleventh Census other than to refer to such statistics.

Since 1850 we have the population at each census compiled with reference to age, and we thus know at each of said censuses how many persons there were under ten years of age. This number represents the survivors at each census of those born in this country during the preceding decade (immigration at this age period being relatively insignificant), and this number would therefore be in proportion to the number of births during the preceding decade. If now we compare the number of children under ten years of age at each census with the aggregate population of the preceding census, we obtain a ratio proportional to the average birth rate during the given decade. We thus have the following table:—

Year.	Aggregate Population in Thousands.	Year.	Children under 10 Years, Thousands.	Number of Children to each 100 Popul.
1840	17,069	1850	6,739	39.5
1850	23,192	1860	9,014	38.9
1860	31,443	1870	10,329 <sup>a</sup>	32.8 <sup>b</sup>
1870	38,558 <sup>a</sup>	1880	13,394	34.7 <sup>c</sup>

We know that the figures <sup>a a</sup> are too low, due to the defect of the enumeration of the census of 1870, and that therefore

the figure *b* is too low and *c* is too high. It would probably not be far from correct if we assume 33.7 as the average from 1860 to 1880. These figures can be explained only by the assumption of a very rapid falling off in the birth rate from 1840 to 1880, and it will be found when the age tables are compiled for the census of 1890 that the figure for the decade from 1880 to 1890 will not be much, if any, over 30.

It has been claimed that the "most serious reason" for questioning the accuracy of the Eleventh Census is the fact that this census shows that the decennial rate of natural increase, or more properly the increase of the population excluding immigrants, has fallen from 18.5 per cent, the average of the two decades 1860 to 1880, to 14.4 for the decade 1880 to 1890.

It is obvious that these critics overlook the fact that this rate has been gradually falling, as shown in the following table:—

Decade.	Per Cent of Increase, Excluding Immigrants.
1820-1830	32.1
1830-1840	28.0
1840-1850	25.8
1850-1860	24.4
1860-1870}	Average, 18.5
1870-1880}	
1880-1890	14.4

There certainly is no more reason to question the Eleventh Census because this rate fell from 18.5 to 14.4 than there is to question the Tenth Census because this rate fell from 24.4 to 18.5.

Let us, however, compare these rates, which indicate approximately our rates of natural increase, with the figures which we have, indicating approximately the birth rate. Naturally, the difference between these two rates would indicate a rate proportional to the death rate. It must of course be understood that these figures do not indicate the actual

birth and death rates, but merely that they are proportional to such rates. Here is the table:—

Decade.	Rate of Natural Increase.	Birth Rate.	Death Rate.
1840-1850	25.8	39.5	13.7
1850-1860	24.4	38.9	14.5
1860-1870 }	Average, 18.5	33.7	15.2
1870-1880 }		30.2	15.8
1880-1890	14.4		

We notice in the first place that the death rate, or rather the difference between what we call the rate of natural increase and what we call the birth rate, has gradually increased, and it is but natural that the forces acting to produce this result should have continued, though perhaps not to so great an extent, during the past decade. It is therefore not unnatural to expect that this difference will reach during the past decade 15.8, which if added to 14.4, the rate of natural increase, would give us 30.2 as the figure corresponding to what we have called the approximate birth rate. Inserting these figures in the table (and it will be found when the age tables are compiled for the Eleventh Census that they are nearly correct), and examining the table as a whole, nothing can be found in it either startling or remarkable. It would indeed be strange were the table to look otherwise than it does.

One editor has actually criticised the Superintendent of the Census for not discussing this most natural falling off in the rate of natural increase. Perhaps the editor in question would desire the Superintendent of the Census to enter into a discussion of the many reasons for the constant decrease in the birth rate during the past fifty years. The data bearing on this question are so meagre, and the causes which have worked to produce this effect so many and so varied, that even a Superintendent of Census, diversified as are the requirements of his duties, can hardly be expected to enter

upon a discussion of them. Let us, however, briefly consider a few of these causes.

As before stated, the most important factor bearing upon the birth rate is the age at which marriage is contracted. While data bearing upon this subject in this country are scarce, still such data as are available show clearly that the average age at which marriage is contracted is constantly advancing. In Massachusetts, for example, the average age of women marrying for the first time has increased during fifteen years from 23.4, in 1872, to 24.4, in 1887.

Again, the proportion of married women and the ages of such married women should be taken into account. Here again, unfortunately, we have no complete data; but if we refer to the Massachusetts Registration Report, we find in the first place that there was a sudden drop in the marriage rate about the year 1858, and that this rate remained abnormally low until about 1864. It then increased rapidly, reaching a maximum of 22.15 in 1866, and remained high until 1873, when it suddenly dropped and has remained comparatively low ever since.

While, of course, it is dangerous to draw any conclusions from so small a fraction of the population of the United States,—about one-thirtieth,—still it is believed that these figures represent the general characteristics of the fluctuations of the marriage rate for the entire country.

It has been found in Sweden that the difference between the mean age at marriage and the mean age of mothers is about six years. The difference in this country cannot be far from this, and it is therefore safe to assume that the births of any given year should be compared with the marriages six years previous, so that the births during the decade from 1880 to 1890 should be compared with the marriages during the decade 1874 to 1884, and likewise for the births during the decade 1870 to 1880 we should refer to the marriages from 1864 to 1874. We thus have this table:—

Decade.	Average Persons Married to 1000 Living.
1855-64	19.25
1865-74	20.79
1875-84	17.14

Dr. Farr, in discussing the causes of fluctuations in marriage rates, says: "It is a fair deduction from the facts that the marriage returns in England point out periods of prosperity little less distinctly than the funds measure the hopes and fears of the money market. If one is the barometer of credit the other is the barometer of prosperity." It is believed that the causes operating to affect these fluctuations in the marriage rate of Massachusetts were not local, but acted throughout the United States. We can see clearly in this table of marriage rates of Massachusetts the effect of the reaction following the close of the war, and even more marked the effect of the panic of 1873.

To explain fully the falling off in the rate of natural increase we need hardly assume more than that these fluctuations in the marriage rates were general throughout the country, and that the average fecundity of a marriage has not increased. There are, in fact, many reasons to believe that it has diminished appreciably.

In considering the question of our natural increase, one is confronted at almost every turn by a lack of sufficient data for any positive deduction. We have already referred to the absence of reliable statistics relating to births, deaths, and marriages, and the proper tabulation of data relating to immigrants coming into this country. It is painful to anyone interested in American statistics to contrast our entire lack of data relating to these subjects with their thorough registration and compilation by every other civilized country.

In regard to the compilation of data obtained by the Census Office itself, it is believed that the Eleventh Census of the United States will far surpass any previous census in

this or any other country. In the first place, we have on the schedule of population itself the additional inquiries as to the number of children born and living, and the number of years that foreign-born persons have resided in this country. We also have, as at the Tenth Census, the inquiry relating to conjugal condition and whether married during the census year. These latter inquiries unfortunately were never compiled for the Tenth Census, and hence we shall probably be unable to make any comparisons when this information is compiled for the Eleventh Census. If the answers to these inquiries are compiled in connection with sex, race, age, and nativity, and a further distinction is drawn between the native born of native parentage and the native born of foreign parentage, as it is believed will be done by this census, we will have a mass of information such as has never been obtained in this country, and such as will increase in value at each subsequent census for purposes of comparison. With such data from previous censuses the reasonableness or unreasonableness of the rate of natural increase can readily be demonstrated.